Tissue Stem Cells: Architects of Their Niches.

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Public Summary:
Stem cells are important for tissue maintenance and would healing. Despite how different the structures of different tissues are, stem cells in many tissues use similar methods to communicate with their niche, or environment. This review uses skin and skeletal muscle tissues to show common principles of how stem cells interact with their niches and guide rejuvenation and healing. It also discusses how stem cell communication breaks down during aging. FInally the authors discuss the medical advances arising from the use of stem cells.

Scientific Abstract:
Stem cells (SCs) maintain tissue homeostasis and repair wounds. Despite marked variation in tissue architecture and regenerative demands, SCs often follow similar paradigms in communicating with their microenvironmental "niche" to transition between quiescent and regenerative states. Here we use skin epithelium and skeletal muscle-among the most highly-stressed tissues in our body-to highlight similarities and differences in niche constituents and how SCs mediate natural tissue rejuvenation and perform regenerative acts prompted by injuries. We discuss how these communication networks break down during aging and how understanding tissue SCs has led to major advances in regenerative medicine.